

## ABSTRACT

Sodar systems and methods for acoustically sounding air are disclosed in which chirps longer than 300 ms – and preferably with durations of tens of seconds – are used  
5 along with matched filter and/or Fourier processing methods to derive phase signals indicative of air characteristics in range. A listen-while-transmit strategy is preferred, the direct signal being removed by subtracting the phase signals from two or more receivers located near the transmitter so as to be in the same noise environment. The resultant differential signals can be related to cross-range wind with range distance. In one  
10 example, apparatus (100) is employed comprising a reflector dish (102) over which one central loudspeaker (110) and four microphones (112, 114, 130 and 132) are mounted, the microphones preferably being located on cardinal compass points and having their axes (124, 126) slightly angled with respect to the vertical transmission axis (122).